

DEVELOPING A MANAGEABLE PRE-INCIDENT PLANNING PROGRAM  
WITHIN THE CENTERVILLE-OSTERVILLE-MARSTONS MILLS  
DEPT. OF FIRE-RESCUE & EMERGENCY SERVICES

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This paper is dedicated to my wonderful wife, Beth, and my two beautiful children, Nathaniel and Grayce. Anything I've accomplished would not have been possible without them. With them nothing is impossible.

### **ABSTRACT**

The problem is that C-O-MM Fire's pre-plan system has become outdated, inaccurate, and does not exist on some new construction. This places firefighters at risk with either no, or inaccurate, information.

This research, through a descriptive method, is to determine changes needed to develop and maintain accurate pre-fire plans faster. Procedures included a literature review of national standards, fire service textbooks and journals, and surveys of departments locally and nationally.

The results were changes C-OMM Fire could implement to develop and manage pre-plans, including developing a team of company officers, information technology, local businesses, and prioritizing structures to maintain preplans on. Develop a system to ensure preplans are updated on a regular basis and continue to develop a mobile computer system for preplans, with links to additional information, in an easy to use format.

## CONTENTS

<b>ABSTRACT</b> .....	3
<b>INTRODUCTION</b> .....	5
<b>BACKGROUND AND SIGNIFICANCE</b> .....	8
<b>LITERATURE REVIEW</b> .....	12
<b>PROCEDURES</b> .....	28
<b>RESULTS</b> .....	31
<b>DISCUSSION</b> .....	38
<b>RECOMMENDATIONS</b> .....	43
<b>REFERENCES</b> .....	46
<b>Appendix A : (Example of current pre-plan in C-O-MM Fire apparatus)</b> .....	50
<b>Appendix B: (Map of the Town of Barnstable showing the C-O-MM Fire District)</b> . .....	51
<b>Appendix C: (Pre-Fire Plan Survey)</b> .....	52
<b>Appendix D: (C-O-MM Pre-Incident Planning Chart)</b> .....	53
<b>Appendix E: (NFPA 1620: Example of Preplan Form)</b> .....	55

## INTRODUCTION

The Centerville-Osterville-Marstons Mills Department of Fire-Rescue & Emergency Services (C-O-MM Fire) was first established as a volunteer department in 1926. During the 1960's call volume had increased to a level that the department had to hire its first career firefighters. More career firefighters followed in the 1970's including the hiring of the department's first career fire inspector.

Though the fire inspector's responsibilities were primarily compliance inspections of businesses, residences, and public fire education, over time preplans became a part of the inspector's job. Those initial pre-plans were hand drawn, mimeographed, and limited to only those structures the fire department had a physical key for. Copies were placed in notebooks in all front line apparatus.

When the fire inspector, Lt. Miles J. Pawloski, was promoted to Captain and re-assigned as a Shift Commander, for some reason the responsibility of pre-plans remained with him and not given to the new fire inspector. During this time the number of pre-plans were expanded and included additional facilities where life and safety hazards were of a concern. In hindsight, the decision to take the responsibility of pre-plans away from fire prevention started a communications problem within the department. Fire prevention did not often inform those responsible for pre-plans of new construction, renovations of existing structures, or other changes that should be reflected on accurate preplans.

This author, in 1994, upon being assigned as a shift Lieutenant to Captain Pawloski's group, first got involved with pre-plans by re-creating and updating existing pre-plans using computer generated drawing programs. The purpose was to improve upon the hand drawn pre-

plans. Still very time consuming; these pre-plans were an improvement over the older, original, ones. Upon Captain Pawloski's retirement, C-O-MM Fire Chief John Farrington assigned the responsibilities of pre-plans to this author.

In the proceeding years the department developed an entirely new quick access pre-plan program, developing a new format, with more accurate plans and information, but still in a hard copy format and carried on front line apparatus. New buildings, renovations of older structures, and continued changes in occupancies of existing structures, with limited time, and only one person devoted to the project, allowed pre-plan development get further behind. The maintenance and updates required for existing pre-plans often meant creating new preplans were delayed further. As of this writing the department still carries pre-plans dating back to the 1970's and 80's.

In 2002 Chief Farrington approved applying for, and the department received, a Fire Act grant for the purpose of acquiring computers in the apparatus and developing an accurate and manageable computerized pre-plan program. Technology presented new challenges, and though ongoing, the program remains behind and is still overwhelming to be assigned to just one individual. The technology required also meant that the department's Information Technology person, also with limited time devoted to pre-incident planning, now had to be a part of the process. The problem is that C-O-MM Fire's pre-plan system, as currently conducted, is overwhelming; time consuming, outdated and inaccurate. This places firefighters at risk as many pre-plans are outdated, don't exist on new buildings, and are often no longer used by responding company officers.

The purpose of this applied research project is to determine what changes the department could make in its current system to produce accurate pre-plans faster, keep them updated, and in

a format easy to use by first responders. A descriptive research method was used to help answer the following research questions:

1. Given current personnel and time limitations what buildings should the department maintain preplans on?
2. What are the recommendations by the NFPA and related public safety agencies regarding pre-plans?
3. What system can the department utilize and/or implement that will allow preplans for new construction hazards to be processed faster?
4. What system can the department implement to ensure pre-plans are current and accurate?
5. How are other departments addressing similar pre-plan issues within their own departments?

## **BACKGROUND AND SIGNIFICANCE**

The Centerville-Osterville-Marstons Mills Fire District is located 70 miles south of Boston on Cape Cod in Massachusetts. Established in 1926 it is one of five different fire departments serving the Town of Barnstable. (Appendix B) With an annual population currently approaching 26,000 this figure soars to more than 40,000 (Barnstable, 2005) during the summer months.

The Fire District is independent of the Town of Barnstable and raises its own taxes, or charges for services rendered, as needed. As of 2006 the department operated three stations, one each located in the villages of Centerville, Osterville, and Marstons Mills.

To do this the department has a career staff of fifty-eight uniformed personnel including the Fire Chief, the Deputy Fire Chief, four Captains (Shift Commanders), 8 Lieutenants, 4 Senior Privates, a Firefighter-Mechanic, 2 Fire Prevention Officers, 26 firefighters, and 4 dispatchers. All firefighters and officers are certified to the emergency medical technician-basic, intermediate, or paramedic level. Operational personnel are assigned to 4 groups of 24-hour shifts. The department currently maintains minimum staffing of ten, three firefighters in each of the three district stations, and a Shift Commander who responds in a separate car. The department responded to 3,797 calls (Centerville, 2006) in 2005.

There is a minimum of one ambulance, one engine-company, and a small rescue boat, assigned to the outlying stations, station 2 in Osterville and station 3 in Marstons Mills. The bulk of the equipment that includes a quint aerial, a rescue-engine, a reserve engine, a brushbreaker, a hovercraft and additional small boats are assigned to station 1, the headquarters fire station in Centerville.



C-O-MM Fire first starting developing pre-plans in the mid-1970's based entirely on those properties the department had keys for. In the early 1980's this list was expanded to include additional target hazards that presented life and safety concerns to the fire department. Currently the department carries preplans on 80 structures. The information includes building construction, nearest water supply locations, fire protection systems and utilities on site, known hazards materials, as well as fire flow requirements. There is a plan of the building in various degrees of detail depending upon when the pre-plan was completed.

For the past twenty years it has been the primary responsibility of one person was to develop, update, and maintain preplans. In this same time the fire district has seen a dramatic increase in construction, both new and renovation. This has resulted in the necessity in some pre-plans having to be re-done a number of times over. Over time the department has become increasingly behind in preplan development.

Looking to technology to help the department solve its problems also created new challenges in pre-plan development. The fire department computer system originally bought for our stations was on a Macintosh platform and many pre-plans were created on it. In 1999 the decision was made to go to a Windows operating system. Many of our pre-plans, completed using a canvas drawing program, did not convert to the new operating system. As a result, these pre-plans exist only as hard copies and will need to be redone on the Windows system.

Firehouse software was purchased and used for incident reports, payroll, training, and all aspects of fire department operation. Much time was devoted into looking for software that could be used with Firehouse in developing and maintaining preplans.

After receiving a 2002 Fire Act grant allowing the department to purchase mobile computers for first due apparatus, the development of pre-plans was halted as the department

attempted to solve these new challenges into pre-plan development. Old pre-plans were scanned in and loaded into vehicle computers but to access them was time consuming and complicated enough that they were not utilized. Time was spent working with the Town of Barnstable in linking our data with the GIS information. A GPS locator was used to note hydrant locations, landing zones, and other needed information on all maps involving the department's response areas. The result was the department continued to maintain hard copies, based on the old format, until computer problems could be solved. In the mean time the computers, and pre-plans, continued to be developed for computer-aided dispatch, GPS tracking, and for other uses by first responders. Only as of June 2006, was a new operating system loaded that will allow first responders to easily access pre-plans on the computer. The system is linked through the department's Firehouse software. Once updated and online, first responders and incident commanders, will be able to access the most up-to-date building and fire prevention information the department has available. It is the belief of the Fire Chief that fire inspection information is of little use on the emergency scene if it's locked up in a filing cabinet back at the fire station. The goal of the grant request for mobile computers was to put dispatch, responding companies, and the incident commander all on the same page with the most updated information possible. As the department moves forward in computerizing its pre-incident planning the timing for this research is perfect to help the department determine what changes the department can make to produce preplans faster, keep them updated, and in a format easy to use by first responders. The author is optimistic that this research will help solve these problems and help the department reach its goals much quicker

This topic is directly related to the National Fire Academy's Leading Community Risk Reduction course. The community risk reduction process involves steps that can easily be

applied to this particular program and will assist the department in helping to solve our current problems with pre-incident planning development. Step II of the risk reduction process, assessing community risk, is one part of the model that will help us develop a manageable pre-plan process. Today's risk involves new construction, limited personnel, hazardous materials and the type of occupancy, the department has to assess those structures and determine which require pre-plans. Company officers, but especially the incident commander, must have accurate information to help identify tactical and strategic responses to an incident. The department must have a process to help assess the risk to our community and to the men and women who respond at the time of an emergency. Good, accurate, pre-plans help the department to reduce that risk.

The Leading Community Risk Reduction class also focuses on the need for team building in project development and implementation. The department recognizes that no longer can one person be responsible for all aspects of pre-plan development and management. Company officers, firefighters, fire inspectors, and information technology people must all be a part of the team for the process to work. Accurate pre-plans, the ability to "see" the building layout and implement strategies based on preplan information helps the department work within the United States Fire Administration's five year operational objectives that include reduction of life loss to firefighters, and those 14 and below, or 65 and above, by 25%.

A descriptive research method for this project will be used and will include a literature review, questionnaires to other departments, and learning how other departments are developing and maintaining their pre-plans.

## LITERATURE REVIEW

The literature review started with the resources of the National Fire Academy's Learning Resource Center in Emmittsburg, Maryland. NFPA Standard, including NFPA 1620 Recommended Practice for Pre-Incident Planning, (NFPA 1620, 2003) was reviewed along with the fire prevention/inspection records, current preplans, standard operating guidelines, and the library of the Centerville-Osterville-Marstons Mills Department of Fire-Rescue & Emergency Services. Another tool utilized was C-O-MM Fire's own Firehouse software. This system is used for maintaining department records, including training, fire prevention and building information, as well as a computer aided dispatch program. Current building information is sent to emergency vehicles comes from the database of this program. The Internet was an additional resource that allowed the author to explore options on both a national and international scale.

"Pre-fire planning", also known as pre-fire inspections, is the practice of drawing up specific plans for firefighter operations at properties or locations. While it would be beneficial to preplan every structure in our jurisdictions, we know that this task is probably impossible. Therefore, the department opted to pick specific structures and survey them for what we consider to be critical information in the event that "someday" there might be a fire. As the officer, it is your job to make pre-planning activities meaningful and productive. (McLees, 1998)

Why preplan? Having access to the right information at the right time is crucial in emergency operations. No individual can be expected to remember it all. But fire officers cannot afford to be "surprised" at an emergency by facts that they are unaware of, nor can they afford to waste time, manpower, or materials on actions that do not contribute directly to their success. (Coleman, 1978)

Good, updated, accurate pre-incident planning is one of the keys to successful emergency incident management, keeping our firefighters, as well as the citizens we protect, safe in the process. (Rogers, 2002) That was the primary premise in C-O-MM Fire's application for the 2002 Fire Act Grant application.

This isn't a new concept. In 1867 John Stanhope Damrell, as the Chief Engineer for the Boston Fire Department, with his own pre-plan concerns, reported on problems with hydrants and water pressure in Boston and expressed concerns about the problem of no enforcement authority for building inspection during construction. John Damrell was Chief of the Boston Fire Department from 1866 to 1873, which included the Great Boston Fire of 1872. He later became Boston's Inspector of Buildings in the 1880's. Damrell brought a new level of professionalism and organization to firefighting and was instrumental in creating modern building codes at the national level. (Timeline of John, 2006) The great Boston fire took 16 hours to burn 1000 buildings covering 70 acres. It jumped across 16 streets of various widths, mostly narrow. Most of the fire spread was by radiation, with considerable spread against the wind. Some of the wooden-exterior buildings burst into flames all at once after being subjected to radiant heating. (Clark, 1991)

Fifty-one years ago Fire Engineering published an article that referenced "the importance of inspections in pre-fire planning for salvage, as well as for fire protection." (Woolley, 1955) Although the article focused on pre-fire planning from a salvage standpoint, that of saving commodities and materials by anticipating fire, it is an example that shows that pre-planning has been an important consideration in the fire service, and a focus of trade journal articles, for many years.

The National Fire Protection Association (NFPA) updated an established standard for a pre-plan process in 2003. NFPA 1620, Recommended Practice for Pre-Incident Planning. (NFPA 1620, 2003) Chapter 4 addresses the Pre-Incident Planning Process including the development of a pre-incident plan:

4.1\* General.

**4.1.1** Before the pre-incident planning process begins, all parties involved should be familiar with the basic information to be gathered and included in the final plan.

**4.1.2** The following factors should be evaluated when assessing the potential situations that could affect a facility during emergency conditions:

- (1) Construction
- (2) Occupant characteristics
- (3) Protection systems
- (4) Capabilities of public or industrial responding personnel
- (5) Availability of mutual aid
- (6) Water supply
- (7) Exposure factors

**4.1.3** The pre-incident plan should be a cooperative effort among the plan developer, facility staff, and responding personnel.

**4.1.4** Other persons who might be able to provide valuable input during the development of the pre-incident plan, including technical experts who might not actually respond to an incident, should be consulted as appropriate.

**4.1.5\*** The pre-incident plan should be coordinated with an incident management system.

**4.1.6** The responsible agency's ability to respond to and control an incident in a specific occupancy should be evaluated.

**4.1.6.1** This evaluation should include the department's equipment, personnel, and personnel training, to determine whether they are capable of providing a sufficient response.

**4.1.6.2** Where it is necessary to involve other emergency response agencies, these should be chosen after their capabilities have been evaluated.

**4.1.7** Once the basic information has been gathered, the development of the actual pre-incident plan should begin.

**4.1.8** The plan should be developed and maintained so that all participants are aware of their respective responsibilities.

**4.1.9\*** The development of a pre-incident plan for new facilities should begin before construction and actual occupancy.

## **4.2 Develop a Pre-Incident Plan.**

**4.2.1** In developing a schedule for pre-incident plans, strong consideration should be given to items such as the following:

- (1) Potential life safety hazard
- (2) Structure size and complexity
- (3) Value
- (4) Importance to the community
- (5) Location
- (6) Presence of chemicals
- (7) Susceptibility to natural disasters

**4.2.2\*** Once a site has been selected for pre-incident planning, the plan developer should explain the nature of the information required.

**4.2.3** To develop a pre-incident plan, plan developers should regularly visit the property to become thoroughly familiar with its layout, contents, construction, and protection features.

The current pre-plan form used by C-O-MM Fire contains some, but not all, of these elements.  
(Appendix A)

The death of six Massachusetts firefighters in December of 1999 brought to light the importance of preplanning vacant buildings as well as occupied structures. By all accounts the Worcester Cold Storage Warehouse, where this tragedy occurred, was a windowless, dark, six-story building with a very confusing layout. In a Fire Chief magazine article Charles H Rule questions if the Worcester six died in vain? More importantly he notes: “A preplan program for unsafe buildings would include an analysis of exposures, the required and deliverable fire flow for the building and exposures, and especially all structural deficiencies: open shafts and skylights, missing stairs, removed structural components, punky roofs, evidence of use by homeless and other indicators of conditions that are unsafe for firefighters. These preplans should be reviewed frequently with fire personnel and be kept in apparatus for instant referral, not in the fire station filing cabinet. (Rule, 2001) The National Institute of Occupational Safety and Health (NIOSH) recommendations regarding the Worcester Cold Storage fire included that fire departments should ensure that inspections of vacant buildings and pre-fire planning are conducted which cover all potential hazards, structural buildings materials (type and age), and renovations that may be encountered during a fire, so that the Incident Commander will have the necessary structural information to make informed decisions and implement an appropriate plan of attack. (Dedman, 2005) The amount of companies, personnel, and special equipment specified should be based on reasonable pre-fire planning, such as the water requirement method, rather than what is needed at just the average fire. (Clark, 1991). NFPA 1620 addresses specific pre-plans for occupancies that include assembly, educational, health care, detention and correctional, residential, residential board and care, mercantile, business,



industrial, and warehouse and storage, though not of vacant buildings. This standard also gives sample preplans (Appendix E) to be used as an example of pre-plan development. (NFPA 1620, 2003)

A review of firefighter fatalities from across the United States and posted online at the CDC's NIOSH website on Fire Fighter Fatality Investigation and Prevention Program: Fire Fighter Fatality Investigation Reports finds that out of the 317 fatalities posted, in 21 incidences, NIOSH specifically recommended that fire departments conduct pre-incident planning and inspections to facilitate development of a safe fire ground strategy. (NIOSH, 2006) These 21 firefighter fatalities were in commercial structures.

When a fire department is acquainted with the potential of a fire before it occurs, that department has an advantage over the fire, provided that it makes preparations in keeping with the need shown by the earlier study. (Clark, 1991) This echoes Clarence "Smiley" White, a field instructor for the Maryland Fire & Rescue Institute out of the University of Maryland, who incorporates the importance of pre-planning into other aspects of fire suppression training. In reviewing ventilation practices in his instructor guide for Truck Company Operations he notes, "Every building has some natural openings. The only sure way to know which natural openings can be used for fire fighting is by making pre-fire inspections. Pre-fire inspections save time and effort on the fireground." (White, 2000)

Progressive fire departments have long recognized the value of planning to foresee dangers and plan actions in response to fire potential in conventional commercial and industrial establishments. Advance planning also is necessary in an effective disaster control program. (Kramer & Bahme, 1992) On the federal level the Department of Homeland Security's

National Response Plan is essentially a national pre-plan with goals similar to local pre-plans.

The National Response Plan established protocols to help:

- Save lives and protect the health and safety of the public, responders, and recovery workers.
- Ensure security of the homeland.
- Prevent an imminent incident, including acts of terrorism, from occurring;
- Protect and restore critical infrastructure and key resources;
- Conduct law enforcement investigation to resolve the incident, apprehend the perpetrators, and collect and preserve evidence for prosecution and/or attribution;
- Protect property and mitigate damages and impacts to individuals, communities, and the environment; and
- Facilitate recovery of individuals, families, businesses, governments, and the environment. (DHS, 2005)

These protocols share many of the same characteristics of Ronny J. Coleman's five basic elements in his pre-planning concept first published in 1978:

- Identifying potential problems that endanger the maintenance of life safety and the preservation of property and the lives of firefighters;
- Identifying the variables involved in the origin, spread, and control of fires in both specific and generalized situations;
- Providing an information system based on these problems and variables to identify, assemble, and recall facts so that they can be used to select or deploy resources needed in a fire protection system;

- Identifying methods of gaining maximum benefits from firefighting forces, structural components, or built-in fire protection devices;
- Securing the assistance of the community in reducing the danger.

(Coleman, 1978) While these elements focus on the fire problem, fire department pre-plans have expanded to include disaster responses, school hostage or shootings, bomb threats, and countless other scenarios. In discussing fire behavior William Clark wrote, “ If an understanding of the enemy is fundamental to military operations, it is equally so in fighting fire. Firefighters should be armed with sufficient knowledge of their enemy, fire, to protect themselves from it and overcome it efficiently.” (Clark, 1991) Sufficient knowledge must include the sharing of information between both private and public agencies. Other agencies also develop pre-plans and at an emergency incident those plans, incorporated with that of the fire department, may prove to be invaluable to the Incident Commander. Liaisons with other agencies should be maintained. Such agencies are police, National Guard, civil defense, welfare department, building department, medical services, public utilities, and other local, state or federal agencies. (Clark, 1991)

In Canby, Oregon the Canby Tactical Entry Team, aided by the Canby Fire Department, raided a hidden meth lab in an apartment complex. Fire Captain Val Codino, who is also a medic, and serves on the police department’s tactical entry team, made this possible. Through this relationship he was able to share the fire department’s pre-incident plan with the police department. Use of the pre-plan allowed the team to accurately pinpoint the location of the apartment suspected of running the lab. Today the sharing of pre-incident plans between fire and police agencies is growing says Chief I. David Daniels, Fulton County Fire Department. By having the very same preplans as the Canby Fire Department, emergency communications

dispatcher Jim Paul says that dispatchers will be able to drastically improve how they can assist first responders during a major incident. (Fire Rescue Magazine, 2006)

Preplanning helps departments to prepare. “Thorough preparation is never a waste of time” former New York Mayor Rudolph Giuliani states in his book *Leadership* (Giuliani & Kurson, 2002). In response to his staying so calm after the September 11, 2001 attack on New York City, Giuliani wrote, “...it comes down to preparation. Throughout my time as mayor, we conducted tabletop exercises designed to rehearse our response to a wide variety of contingencies”. (Giuliani & Kurson, 2002).

The pre-fire planning process is never ending. Occupancies throughout public safety jurisdictions are constantly changing, either by their use, renovation, or construction of new buildings. Pre-fire planning should involve all fire suppression personnel on a continual basis. It is a course of action against a potential fire that is based on the collective experiences of those involved in the planning process, on known or existing conditions, on the relationship of cause and effect, and on reasonable expectancy. The pre-fire planning process involves four steps:

- 1) information gathering, 2) information analysis, 3) information dissemination, and 4) review and drill. (Carter & Rausch, 1989)

According to Coleman (1978) all preplans must be related to the fire problem, but the type of problem may determine just how much work has to be accomplished in preparing a preplan. He states that there are basically four kinds of preplans. 1. Hazards to firefighter system: this system is designed to the firefighters of potential danger. 2. Block or site preplan system: Some preplans are restricted to the descriptions of whole blocks or on-site descriptions of the access and general layout of the structures. 3. Occupancy or floor plan system: the most specific kind it involves a more detailed analysis of the problems created in the interior of specific buildings. 4.

A combination system: there are some situations that demand all three types of plans. (Coleman, 1978)

In developing preplans, departments have to determine what buildings require preplans. Retired FDNY Deputy Chief Vincent Dunn, a 42-year veteran of the fire service, recommends that for a start, every fire department should pick out the top 10 buildings in the district or in the community that are considered fire challenges. (Dunn, 2004) A further consideration in prioritizing buildings requiring pre-plans is that of life hazard. In tactical planning, as with fire department work, protection of life is given No. 1 priority. In planning to protect life, the fire department must determine the number of occupants of buildings under consideration, concerned with the means available by which occupants may leave a building and the type of assistance that may be required from fire department personnel. (Kimball, 1966) According to Carter and Rausch (1989) pre-fire plans are necessary for all target hazards and special risks, but need not be developed for single-family dwellings or other small occupancies because a standard operating procedure should be sufficient for these occupancies.

An essential part of the pre-plan process is to determine the needed water for fire flow and its availability. As Clark notes, the matter of water supply is one feature of pre-fire planning that is not variable and which can be well analyzed in advance. The location of hydrants, their capacity, water main sizes, and points for drafting water can be determined long before the fire occurs. (Clark, 1991) Building size, location, use, construction type and exposures are just some of the components needed to help determine an accurate fire flow. In his book, *Water Supply Command*, Larry Davis has developed many different standard operating procedures (SOPs) that fire departments can adopt to help them deliver an accurate water supply. His SOP 605 was developed to help departments to determine a rate-of-flow. Davis notes that the purpose of the

SOP is to establish a common method of determining the rate-of-flow required for a given structure and that this method is to be used both in pre-planning of structures and is to be used on the fireground as a basis for estimating the rate-of-flow necessary to achieve knockdown of a fire. In actual fire testing that was done by Iowa State University, fire control was best achieved when the water was delivered in 30 seconds. Because of this the formula was modified to gallons per minute (GPM) for 30 seconds equals length X width X height divided by 100. (Davis, 1990)

The National Fire Academy developed a different formula. Using this formula you determine the area of the structure (length X width), divide the area by 1/3 to determine GPM for the fire area. Allow 25% for each exposure including another room, structure or building, and then establish percentage involvements to determine water delivery needs. (White, 2002) In 1996, to help in pre-planning C-O-MM Fire structures, the department developed a pre-incident planning chart for the purpose of defining multiple alarms. This chart (Appendix D) was developed for use in pre-incident planning to help define a consistency in assigning multiple alarms to a structure based upon fire flow and the National Fire Academy's standard of length X width divided by three. This chart is based upon the estimated gallons per minute flowing and the average personnel/apparatus available at the scene using the department's single/multiple alarm assignments. (Rogers & Whiteley, 1996)

Departments who develop and maintain preplans do it in a variety of ways. The Office of the Fire Marshal, Ontario, Canada in its Ontario Fire Service Messenger notes that an ongoing Pre-Incident Planning program must be an integral part of the departmental training and prevention schedule. It includes a lesson plan that outlines the process for developing and utilizing Pre-Incident Plans. (Office of the Fire Marshal, October/November 2005) Departments include preplanning as part of their standard operating guidelines (SOG). Phoenix Fire includes

in its SOG Pre-planning for Emergencies that; each quarter, company officers will select a tactically significant occupancy to pre-plan for emergency incidents in their first due area. What determines a “tactically significant occupancy” may vary according to an individual company’s response area but, may include, industrial facilities such as woodworking, hazardous materials, general manufacturing or larger storage facilities, residential occupancies such as apartment complexes, condominium complexes, convalescent homes, or senior care facilities, high-rise buildings, health care facilities such as hospitals, clinics or laboratories, and any other occupancy the company officer feels is tactically significant. (Phoenix Fire, 1997)

Another approach being utilized by fire departments in developing pre-fire plans is to ask local business and building owners to help the department by providing plans of their occupancies. In Burnaby, Canada the fire department assigned a veteran fire investigator, Doug Hahn to work on a Pre-Incident Planning Strategy for the town. Once implemented, in a program that could take a full year, the program will require local business and building owners to provide the fire department with a diagram of their property, showing the types and locations of all the different hazards on the site. (Hilborn, 2003) This is similar to a program from Palo-Alto, California where the fire department has posted an online brochure with instructions and symbols to create your own pre-incident plan. (Palo Alto Fire, 2006)

Referenced guidance can help departments determine what structures should have a pre-fire plan, but now the department must assign personnel to carry out the task. A fire officer will have to know how to inspect the preplan site and building, than draw the building preplan diagram identifying its size, construction and occupancies as well as the fire protection equipment the firefighters can use. (Vincent Dunn, 2004) Pre-fire plans are drawn up by firefighters and their company officers and support their previous statement that pre-fire planning

should involve all fire suppression personnel on a continual basis. (Carter & Rausch, 1989) Kimball simply states that pre-fire planning is the specific responsibility of combat officers. (Kimball, 1966). As the officer, it is your job to make preplanning activities meaningful and productive. (McLees, 1998) According to NFPA 1021, Standard for Fire Officer Professional Qualifications the fire officer should be able to develop a pre-incident plan that covers all of the required elements according to pre-incident planning policies and procedures. (NFPA1021 Standard, 2003) During the pre-plan process firefighters should remember that the purpose is not to perform a fire prevention inspection. Rather, it is to seek the cooperation of the management of the facility in the loss prevention and control process from the public fire service point of view. (Wilson, 1988) In his book, Fire fighting/Principles & Practices William Clark states that pre-fire planning will identify major problems, prescribe what is needed to meet them, and provide for meeting such needs. A pre-fire plan should not go too deeply into step-by-step actions. (Clark, 1991)

The literature review of department training records found that some C-O-MM Fire company officers are bringing their crews for “building in-services” in an attempt to familiarize their crews on building hazards, construction types, and layout. However, the majority of these are at the company officer’s discretion, involve no required inspection form and follow up only based upon the officer’s observation. According to training records the department did have a brief program requiring monthly building in-service drills that resulted in 18 occupancies being visited by a total of 68 people between January 1, 2004 and December 31, 2005. (Field, 2006)

Fire departments have looked to technology to help solve the challenges of developing and maintaining pre-plans. Following the April 20, 1999 Columbine High School shootings, Fire Captain Jim Olsen of the Littleton, Colorado, Fire Department developed software that was



further developed by FEMA. The pre-incident planning system (PIPS) uses a CD-ROM to provide law enforcement, firefighters and paramedics with a virtual walk-through of a building, complete with 360-degree panoramic view. When the template is filled out with building information, the interactive floor plans also allows them to click on a part of the building and see the actual hallway or room. (Powers, 2001)

The Milford, Connecticut, Fire Department uses a commercial program ESRI's ARC GIS software to help manage its 3,500 pre-fire plans and to provide fire trucks with instant, mobile access to emergency data when responding to an event. (Milford, Connecticut, 2006) Firefighter Scott Cook of the Granby, Texas, Volunteer Fire Department developed preplans using a web-based HTML format after he read about it in an Internet discussion forum. (Cook, 2006) Cook recommends for departments with budget restrictions purchase used laptops. Not as efficient as a computer aided dispatch system this system can still utilize technology in the attempt to eliminate binders and notebooks holding department pre-plans. Fire Chief Steve North of the McLane (WA) Fire Department also utilizes a web-based pre-plan utilizing Rapid Responder, a program from Prepared Response. (S. North, personal communication, June 26, 2006) His department has used the program to pre-plan all commercial occupancies and a large State College.

C-O-MM Fire utilizes GPS (global positioning system) tracking in its apparatus and links to the graphic information system (GIS) utilized by the Town of Barnstable. The department utilizes this technology to help identify incident addresses, response routes, and location of fire hydrants. Since this program is linked to the town assessor's office the department is in the process of linking to the assessor's maps which have basic building information, including a basic plan of the structure, on most buildings. When complete C-O-MM Fire will then have a

basic pre-plan on all assessed properties, including residential. Firefighters responding to residences will have information on the size of the structure, construction components, and an outlined diagram of the building, with noted sizes, prior to arrival.

For those departments who do not have computers in the apparatus commercial software is available to help departments draw and create pre-fire plans. Locally, the fire department at the Massachusetts Military Reservation uses a commercial program called Fire Zone to pre-plan all high occupancy, high hazard, industrial and high dollar structures. (T. Stephenson, personal communication, July 19, 2006) Sandwich Fire Chief George Russell uses another program called Fire Point. (G. Russell, personal communication, June 27, 2006) Each of these programs offers similar drawing and development options in creating preplans. However, as Vincent Dunn wrote in Firehouse Magazine, the computer program you purchase can help you, but it will not do the work of creating a pre-fire plan for you. You still have to go out and do the legwork that is needed to develop the pre-fire plan. The computer program may look impressive, but remember, what you put into the computer is what you will get out of it. The data must be relevant to your department. As the saying goes, “Garbage in, garbage out.” The human factor is still the most important part of the computer pre-fire plan. (Dunn, 2004)

In summary the literature shows that pre-incident planning has been a concern of the fire service for many years. The literature variety supports that accurate pre-plans, done by the company officer and his/her crews, will help to develop better fireground tactics and keep firefighters safer in the process. Incident Commanders should use these plans as part of their initial size-up of structures and in fire attack strategies. While the Incident Commander will use these plans the literature review finds that the company officer should be the one capable of and assigned the task of developing preplans in his/her response areas.

Further review finds that there are standards and recommended practices that can be utilized by fire departments in developing pre-plans with recommendations for required information that these plans should contain. The review further shows that there is a wide variety of commercial software programs, GIS, and other technology that are available to departments, and the departments are using, to create and maintain their pre-incident plans.

## PROCEDURES

Since this research was based upon problems with our current pre-fire planning process this research project utilized a descriptive research method to help determine how the Centerville-Osterville-Marstons Mills Department of Fire-Rescue and Emergency Services could develop a manageable pre-plan program. The actual research started during this researcher's class time at the National Fire Academy (NFA) in Emmitsburg, Maryland in April of 2006 by taking advantage of the Academy's Learning Resource Center and a review of the many fire journals, magazines, and trade publications available. The Centerville-Osterville-Marstons Mills Fire-Rescue Department also has an extensive library and those resources were utilized upon the author's return to Massachusetts. Included in my department research was an in depth review of our pre-plans, the time involved in producing pre-plans as well as update older pre-plans for accuracy.

The literature review was conducted with the intent of discovering existing standards, such as NFPA 1620, on pre-incident planning. A review of fire service related texts, magazines, and journals, found a number of avenues that would help this researcher develop and manage pre-plans more efficiently than the system currently utilized by C-O-MM Fire.

Online search engines such as Google were utilized using keywords such as pre-plans, pre-incident planning, and pre-fire plans. These searches accessed information from the NFPA, the National Fire academy, Firehouse, NIOSH, and standard operating guidelines from many departments such as the Phoenix (AZ) and Palo Alto (CA) Fire Departments. The information about former Boston Fire Chief John Stanhope Damrell all came about as a result of an Internet search.

The literature reviewed included the Standards of NFPA 1620, particularly recommended forms the NFPA had developed, the Standard Operating Guidelines of the Centerville-Osterville-Marstons Mills Fire-Rescue Department, and the use of commercial computerized programs available for pre-fire planning. The review included a comparison of the pre-plan standards of NFPA 1620 to the evolution of pre-plans and the most recent forms developed and utilized by C-O-MM Fire. The research continued with discussion with the Fire Chief, John M. Farrington, the department's Information Technology person, Janice Gannon, and the C-O-MM Fire Inspectors, Martin MacNeely and Frank Pulsifer. The purpose of these meetings was to help define the direction that department is going in developing new preplans and keeping plans up-to-date. This meeting discussed steps that fire prevention could take to ensure new construction information was available and sent to the responsible parties for pre-incident planning. When asked what his vision of what C-O-MM Fire preplans should consist of Chief Farrington responded that he wanted a program, coordinated by a Lieutenant, that would give first due personnel a "down and dirty" simple, quick access, plan, with additional information that could be accessed in the event of an actual incident. (J. Farrington, personal communication, August 28, 2006)

One of the most important pieces of research sent out was surveys to the Barnstable County Fire Chiefs, and Executive Fire Officer students from the March 2005 Executive Development and the 2006 Leading Community Risk Reduction Classes. A total of 58 surveys (Appendix C) were sent out, with only 19 returned or only 32.76%, despite duplicate emails. Out of the 19 returned 13 different departments, or 68%, have preplans. Those departments that did currently have pre-plans recognized it as being a problem for their jurisdiction. Locally, the Chief of the neighboring Hyannis Fire Department, Harold Brunelle, in response to this author's

survey, asked that when this research was complete, to meet him for lunch with the express purpose of discussing what steps Hyannis Fire could take to start developing pre-plans in his jurisdiction. (H. Brunelle, personal communication, July 12, 2006)

The research in reviewing department training records found that C-O-MM Fire company officers are bringing their crews for building familiarization drills, but not on a scheduled basis without any type of formal type of training or review in place in the expectations when conducting these drills. Simply put, officers are using their discretion in conducting building reviews and with no plan in place, there is no consistency in how these drills are being conducted. For a brief time the department did initiate drills requiring certain buildings be reviewed but the process was not continued.

The parts of the research that this author was most interested in was in how other departments were dealing with the issue of developing and managing pre-plans, particularly who was responsible. Much of the literature review placed the responsibility on the company officer and this was supported by 10 of the surveys.

Many departments have turned to technology to create and link pre-plans with existing information such as GIS or fire prevention information. However, most continue to rely on the hard copy notebook in the front of the apparatus.

This research found that there are a number of ways C-O-MM Fire can improve in the pre-plan development process. Not surprisingly many departments are dealing with the similar issues, what buildings need to be pre-planned, who will do it, and how are we going to make them? Time and personnel are still important considerations, especially for smaller departments.

## RESULTS

This research began as a result of this author's involvement in department pre-incident planning. Fifty-eight surveys were sent to Fire Chiefs in Barnstable County, and students in the Executive Fire Officer program. Those surveys, their comments, along with the literature review were all used to address the research questions.

### **Research Question #1:**

**Given current personnel and time limitations what buildings should the department maintain pre-plans on?**

In a review of the deaths of six Worcester firefighters in December of 1999 at the Worcester Cold Storage Warehouse in Worcester, Massachusetts the National Institute of Occupational safety and Health (NIOSH) recommended that fire departments should ensure that facilities like these should be pre-planned. An online search found 21 different firefighter fatalities in which the follow up NIOSH report specifically referenced the need for pre-fire plans. NFPA 1620, Recommended Practice for Pre-Incident Planning (NFPA 1620, 2003) addresses specific pre-plans for occupancies that include assembly, educational, health care, detection and correctional, residential, residential board and care, mercantile, business, industrial, and warehouse and storage. Fire departments can utilize this list, which includes almost all structures within a community, to help prioritize their needs. Deputy Chief Randy Jaeger from Des Plains, Texas states his department prioritizes occupancies based on hazard and largest square footage. (R. Jaeger, personal communication, June 28, 2006) In Memphis, Tennessee, according to Fire Prevention Supervisor Donald Pannell, fire companies are asked to identify sites with the highest loss of life potential and address them first, while in Garland, Texas each Captain is assigned one

occupancy per month. The Captains submit recommendations and each is evaluated as to the hazard. Only significant hazards are preplanned. Each station in San Jose, California is responsible for pre-plans in their own district. Captain Allison Cabral notes that buildings are first pre-planned based on life hazards. (A. Cabral, personal communication, July 14, 2006) Prince George's County Fire Department Battalion Chief Jerome F. Lamoria informed me that his department prioritizes pre-plans and updates them using the NFPA 101, Life Safety Code as a guideline:

Group 1: Annual Updates Required:

INS – Health Care and Penal Occupancies (includes occupancies for the aged).

HAZ – Hazardous Material Occupancies

Group 2: Update Every 3 Years:

ASY – Places of Assembly

EDU – Educational Occupancies

IND – Industrial Occupancies

STO – Storage Occupancies

Group 3: Update Every 5 Years:

RES – Residential Occupancies

MRI – Mercantile Occupancies – over 5000 square feet under one roof.

Group 4: Update As Needed:

MR2 – Mercantile Occupancies – under 5000 square feet under one roof. (J. Lamoria, personal communication, July 19, 2006) Out of all the literature review and information from surveys this process was the one that was most detailed and complete. Unfortunately many departments, including locally Cotuit and West Barnstable, but also in cities like College Station, Texas, home



to Texas A&M with a 5200 acre campus and a student population of 36368 (College Overview, 2006) still do not have facility preplans.

In a simpler approach retired FDNY Chief Vincent Dunn recommends that to start every fire department should pick out the top 10 buildings in the community that are considered fire challenges. (Dunn 2004) This approach seems to be an easy, logical, one for many communities or response areas. Carter and Rausch (1989) state that pre-fire plans are necessary for all target hazards and special risks while Kimball (1966) reminds us that protection of life is given No. 1 priority.

Centerville-Osterville-Marstons Mills first starting pre-planning structures based first upon the department having a key for the facility. Over the years, that has changed and pre-plans are based upon problems found at a particular facility, life hazard and building construction, or the discretion of the Fire Chief or the officer in charge of pre-plans.

## **Research Question #2:**

**What are the recommendations from the NFPA and related public safety agencies regarding pre-plans?**

The National Fire Protection Association's Standard 1620, Recommended Practices for Pre-Incident Planning appears to be the only standard specifically addressing the requirements of a pre-plan. However, in investigating firefighter deaths the National Institute of Occupational Safety and Health recommended the importance of pre-fire planning in at least 21 firefighter fatalities. NFPA 1021 Standard for Fire Officer Professional Qualifications notes that fire officers should be able to develop preplans. Though the research focused on pre-incident planning for the fire incident the National Incident Management System requires all emergency plans and SOPs to incorporate NIMS components, principles and policies, to include emergency

planning. Obviously, disaster planning represents another type of pre-incident planning and though not the primary focus of this research, its importance cannot be overemphasized as a part of the pre-plan process.

**Research Question #3:**

**What system can the department utilize and/or implement that will allow pre-plans for new construction hazards to be processed faster?**

In the spirit of Leading Community Risk Reduction the department needs to build support at all levels and re-develop the preplan process to include fire prevention, all company officers, information technology, the firefighters, and the business community. Other departments are asking individual businesses to help them by developing their own preplans and this has been a concept not considered by C-O-MM Fire before. Company officers must be trained on how to develop pre-plans, expectations on them and their crews in conducting pre-fire inspections, and a timetable for completion.

The department needs to develop a system to identify and prioritize those structures that need to be pre-planned and a program needs to be developed and implemented that will help to ensure these pre-plans are maintained for accuracy.

Fire Prevention Officers are aware of new construction in the plan review process. That process needs to be developed to include a formal notification process to those responsible for pre-fire planning. In discussions with both fire inspectors they agree that this process must exist, furthermore they have the capability to acquire building plans in different formats such as on CDs. This would allow the department to develop pre-plans on new structures faster and more accurate.

**Research Question #4:****What system can the department implement to ensure pre-plans are current and accurate?**

C-O-MM Fire to needs re-institute the training program that required building familiarizations on a monthly basis. The program needs to be formalized with an in-service inspection form that includes a review of the existing pre-plans. Though company officers should continued to be encouraged to bring their companies to different familiarizations the process should be formalized to ensure that discrepancies are reported and the preplans updated. The department, through its Fire Chief, the Fire Prevention Officers, and at a minimum the officer in charge of pre-fire planning should prioritize, at Chief Dunn's recommendation, the top ten buildings in the community with a commitment to ensure that these preplans are always up-to-date.

The adoption of a policy similar to Prince George's County Fire/EMS department would use NFPA 101, Life Safety Code as a guideline for C-O-MM Fire to develop a policy that ensures that preplans of those structures of most concern are reviewed and updated on a timely basis. With the Centerville-Osterville-Marstons Mills Fire District being primarily a residential community, a policy similar to Prince George's County is easy to adopt and commit to. Instead of C-O-MM Fire attempting to develop a policy on its own Prince George's gives C-O-MM Fire an excellent template that could be used to adopt guidelines faster.

Not until this research was conducted did this author consider asking local businesses to help the department by asking them to develop the pre-plan for us such as the program used by the Palo-Alto (CA) Fire Department or the Burnaby Fire Department in British Columbia, Canada. Many of C-O-MM Fire's pre-plans are used for quick access purposes and lack detail on those larger buildings with many, different, business occupancies. A program, even on a

voluntary basis, that would provide the fire department with a more detailed pre-incident plan could easily be incorporated into existing or newly developed plans. Pal-Alto includes an online brochure that details how the plan needs to be completed. With C-O-MM Fire in the process of developing its website this program could be online for businesses to access.

The department needs to develop a system, including a timetable, that utilizes all aspects of department personnel, including all company officers, fire inspectors, information technology, and all firefighters. For years the task of pre-incident planning was assigned to one officer. Only recently had the physical task of site visits and pre-plan fact gathering been assigned to other company officers. C-O-MM Fire needs to develop a formal program with many of the elements noted here to develop and implement a system to ensure that pre-plans are current and accurate.

#### **Research Question #5:**

##### **How are other departments addressing similar pre-plan issues?**

Greg Rodgers, a Lieutenant from the College Station (TX) Fire Department, and an EFO student, noted in his survey that his department does not have pre-plans on its apparatus and that one reason his department does not have preplans is that no one can agree on what needs to be in them. Most want way more information then you can get, maintain, and update on a regular basis while others prefer the basics, quick, easy, and user friendly. (G. Rodgers, personal communication, July 2, 2006) This is a common problem heard in C-O-MM Fire where we went from a one page hand drawn quick access pre-plan to a five page information intensive form back to a basic two page quick access pre-plan once again. The goal is C-O-MM Fire's use of computers in pre-plan development is to have a simple quick access plan that will be needed for most incidents with the capability of accessing additional information when it's needed. Out of

the surveys returned six did not have preplans carried on their apparatus. Two departments develop preplans but do not carry them on the apparatus.

To carry out the actually physical pre-planning 10 of the 19 departments of the surveys returned relied on the company officer to develop preplans for their areas. Others assigned a fire marshall or fire inspector to carry out the task.

The majority of the departments that carry pre-plans on their apparatus continue to use a hard copy or printed version in three ring binders, though these same departments are considering computerizing their pre-plans for many of the same reasons C-OMM Fire is working in this direction. One concern noted by some departments, and voiced by some C-O-MM Fire officers, is they prefer a printed version that they can physically carry with them on the site or incident scene. To meet this need C-O-MM Fire is looking to install a portable printer on the Shift Commander's vehicle.

## DISCUSSION

This author is a believer in that when an actual incident occurs good, accurate, information is the cornerstone to effective scene management. This information comes in many forms, good communications, a working incident command system that allows for proper scene reports, updates, and tactical information to be relayed to the Incident Commander, along with current building and pre-plan information.

Having been involved with pre-incident planning since approximately 1994, I'm a believer in their importance. My initial involvement was when I volunteered to simply "clean up" existing pre-plans by converting hand drawings to easier to read drawings using computer graphics. It's often heard in the military, but in the fire service as well, "don't volunteer!" My initial involvement led to the Fire Chief eventually assigning it as one of my primary responsibilities. Once formally assigned this author continued to believe that there had to be a better way to do it. Over the years the process continued to develop utilizing information from other departments, online Internet searches, and other information that allowed me to redraft department forms and develop a quick access preplan format.

The process was continued to be time consuming, and since this task was done between emergency calls, it was often sporadic in nature. The Fire Chief, fire inspectors, company officers, and firefighters often made recommendations for buildings that we should have a preplan on but the delay in updating current preplans often resulted in a lack of creating preplans on new construction.

With Fire Chief John Farrington's approval this author applied for a 2002 Fire Act grant for the express purpose of purchasing mobile computers to develop and maintain department

preplans on. This author had seen the PIPS (Pre-Incident Planning System) out of Littleton, Colorado and other commercial programs and thought this was the next evolution in our preplan development process. Once grant funding was received, the next step was how to implement the new process. The process was slow and even in 2006 the results are not what the department envisioned or where we hoped we would be. Though the computer solved problems it also created new tribulations as well. How to convert old preplan files into a new format? How to develop new preplans? How to utilize GIS mapping? How to link the pre-plan file with our Firehouse software? All these presented new challenges. Overtime C-O-MM Fire has started to solve the issues and this author continues to believe that for the department to manage pre-plans properly, to utilize fire inspection and building information that had previously remained locked in file cabinets, the department must continue to utilize computer technology.

Pre-planned structures in our community include buildings constructed in the 1800's, nursing homes, condominium complexes, and other target hazards such as schools and local marinas. Department efforts in pre-planning proved itself on December 10<sup>th</sup>, 2003 during a five-alarm fire involving two neighboring marinas. Four separate buildings that built, repaired, and stored boats were destroyed along with 122 boats of different sizes. Though the final outcome was better then predicted, the reasons included a detailed pre-plan of the buildings involved and strategy and tactics based upon knowing the structures, their construction, their contents, and the hazards they presented.

To develop an accurate pre-plan is a time consuming task. Though pre-plan development was originally assigned to fire prevention over the years the task fell to a line officer. Original C-O-MM Fire pre-plans were based upon the department's having a key to the facility. Overtime the process expanded to include life safety and other target hazards. Those first pre-plans were

hand drawn and mimeographed into three ring binders on the apparatus. The next phase in pre-plan develop was the use of a simple computer drawing program to re-draw the original, hand drawn, pre-plans. As previously noted, the department is now computerizing pre-plans.

The lack of a process has slowed down the development of pre-plans considerably. What structures needed pre-plans, or even which plans to be updated, with few formal requests, was left up to the judgment of the pre-plan coordinator, this author. Later the Fire Chief assigned buildings for shift Lieutenants to pre-plan individual structures. Without a formal plan in place, without a guide on how to properly prepare a preplan, and with no team building on the issue, the assignments were met with resistance and most of the pre-plans did not provide all the information that was needed.

Computerizing the pre-plans brought out concerns by many that they needed a hard copy document. The maintenance of hard copies was one reason the decision was made to computerize the pre-plans. Though the arguments are difficult to dispute the compromise may end up being hard copies for pre-planned structures in their first due response area and not for all structures as currently done and the ability to print out pre-plans at the incident scene should it become necessary. Research found that though few departments had mobile computers, but many departments were now utilizing computers, specifically commercial drawing programs, to help in pre-plan development.

As noted by some departments in this author's research, arguments over what information needs to be included, and the type of plan needed, has actually stopped departments from creating pre-plans. For this reason I believe the easiest answer lies in the use of national standards, NFPA 1620. Since an existing standard defines what needs to be included in a



preplan, and provides sample forms, then, logically, departments should use that standard as a basis for pre-plan development.

One problem in pre-plan development is that of “too much” information and the potential of overload resulting in the Incident Commander not being able to process all the information he/she has available, or the first due officer being able to sort through the information he or she needs when first arriving at an incident. C-O-MM Fire has developed, and this author believes, is on the right track, by developing a Quick Access Pre-Plans that can be utilized by first responders for the majority of responses. This Quick Access Pre-Plan has basic building information noting the location of lock boxes, fire alarm systems, as well as a floor plan of the structure. In the event of an incident requiring more information, the system is being built to easily access the information when needed and not as a first quick access.

As Chief Dunn noted, accurate preplans still require physical work, a site visit, a look at the building and its surroundings. Access, exposures, and water supply, are just a few considerations in pre-plans development. C-O-MM Fire uses the National Fire Academy’s formula of length X width divided by 3 to help determine fire flow. Many of our pre-plans, due to exposure potential, and in an attempt to keep it as simple as possible, simply recommend doubling the fire flow.

In 1994 I contacted local Cape Cod departments were called requesting information about their preplans. The intention was to develop ours after those used by local departments. Few departments had pre-plans of any type. Today, at least six departments responding to my survey noted that they now had pre-plans and two are now working to address the problem.

Research found that pre-plans are not a new fire service idea. As noted in the literature review Boston Fire Chief John Damrell was concerned about water supply and building

construction in the 1800s. Fire service trade journals found articles in the National Fire Academy's learning resource center referencing pre-plans date back as far as the 1950's. I'm sure further research would have found additional, older, references. Most fire service textbooks, spanning many different years, from a number of noted fire service professionals, all referenced preplans in some form. In this author's opinion the National Incident Management System is a form of a type of preplan. Disaster plans represent another type of pre-plan, and following the problems related to 2005's Hurricane Katrina, show the importance of continued training and keeping them updated. Some 21 different NIOSH Firefighter fatality reports referenced the need for pre-plans, and this author believes in the event of a death or traumatic injury of a firefighter in your jurisdiction the department's pre-plan (or lack of) will be a legal consideration. C-O-MM Fire recently had to submit copies of fire reports, fire inspections and available pre-plans to lawyers for civil action related to the December 2003 marina fire previously referenced.

With some internal changes based upon the conducted research, C-O-MM Fire can easily develop a program that will allow the department to develop and manage pre-plans that will be current, accurate, and easily useable.

## RECOMMENDATIONS

As a result of the research conducted, much of which was outlined in the results section of this paper, the following recommendations are made that should help the Centerville-Osterville-Marstons Mills Department of Fire-Rescue & Emergency Services to improve its pre-plan process:

1. Use the recommended pre-plan guidelines in NFPA 1620 to update department pre-plan forms. With relatively few changes current department forms could be adapted to meet recommendations of NFPA 1620. With a recognized standard in place the department should adapt to meet the requirements of the standard.
2. As recommended by Chief Dunn the department should prioritize buildings in the community that present the most life hazard to both the citizens and public safety personnel and require that the pre-plans of these particular structures always get the priority in updating those pre-plans. As a further step the department should adopt and implement a system similar to that of Prince George's County to ensure a system is in place that requires building pre-plans to be reviewed in a certain timeframe, to be updated for accuracy, and not dependant upon a system that pre-plans are updated only when there are noted changes in a structure.
3. The department needs to recognize that pre-plan development has surpassed the ability of one person. Though the department should have a pre-plan coordinator, as it currently

does, it needs to develop a pre-plan team that incorporates the fire inspectors, information technology, the company officers, and the firefighters. The fire inspectors need to include the accuracy of the pre-plan as part of their fire inspection. Inspectors need to inform the pre-plan coordinator of new construction in the plan approval process to speed up the development of new pre-plans. Company officers, working with the firefighters under their command, need to be educated on the pre-plan process and better incorporated into the plan development.

4. The department should look to implement a program such as the Palo-Alto (CA) Fire Department asking local businesses to develop their own pre-plans for the fire department. This information could be used to better develop accurate pre-plans even faster.
5. Information technology personnel need to continue their work on developing an easy-to-use computerized system that can be used for department pre-plans and link to other new technology such as GIS mapping, GPS tracking, and access to fire prevention information, material safety data sheets, and other information should it be required at an incident. The information technology people need to develop a system with the company officers that will develop a quick access preplan that would be utilized for the majority of incidents. The department needs to continue its work of a computerized system for all department vehicles and at some point look to expand the system to share and operate other public safety agencies.

6. The department should again initiate a program, but much more formalized, of building site visits and pre-plan development on a monthly basis as part of its training curriculum.

This program can help determine what buildings may, or may not, require preplans, utilized to determine the accuracy of current preplans, and work with the department to ensure personnel have to opportunity to physically do a site visit to those buildings deemed most hazardous by the department.

Unlike some fire departments there already exists a framework for an excellent foundation within C-O-MM Fire for developing pre-plans. The adoption of these recommendations will go far in helping the department develop and manage pre-plans in a more efficient manner, allowing the department to create pre-plans faster, update pre-plans for accuracy in a more timely manner, and build a team of people in the development process. The department can no longer remain dependant on just one individual to develop and maintain accurate preplans. With education and team building these changes will allow the department to have a reliable process in place that will help the Incident Commander make crucial tactical decisions and help to keep the community and the firefighters safer in the process.

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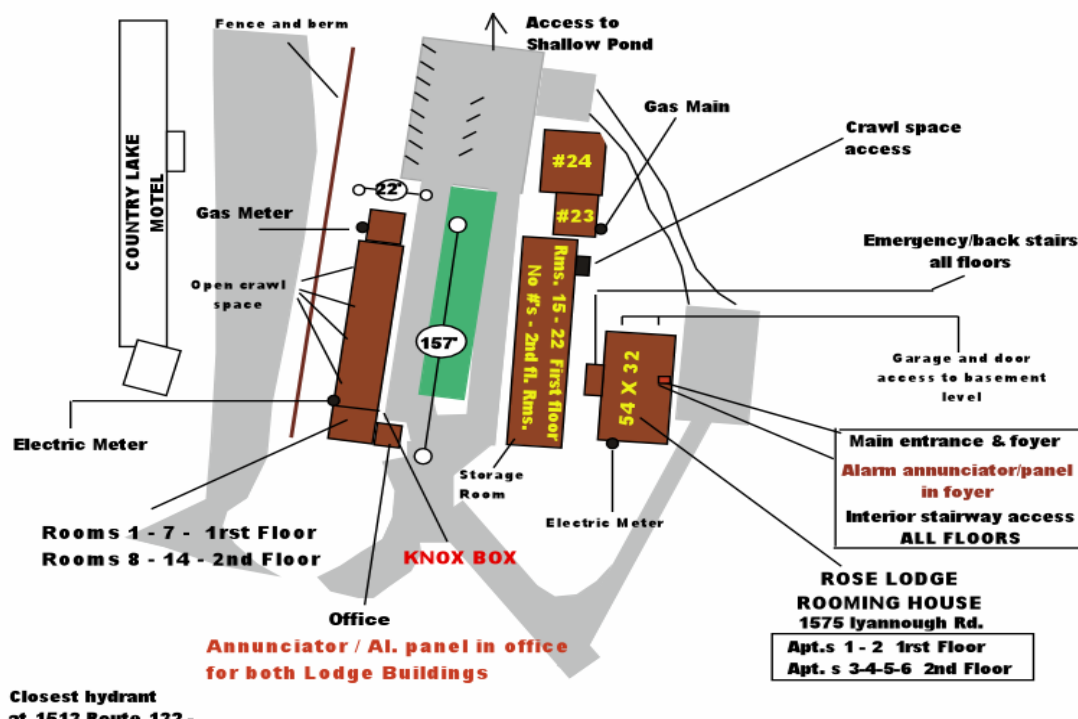
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## Appendix A

Example of completed pre-plan currently in C-O-MM Fire apparatus

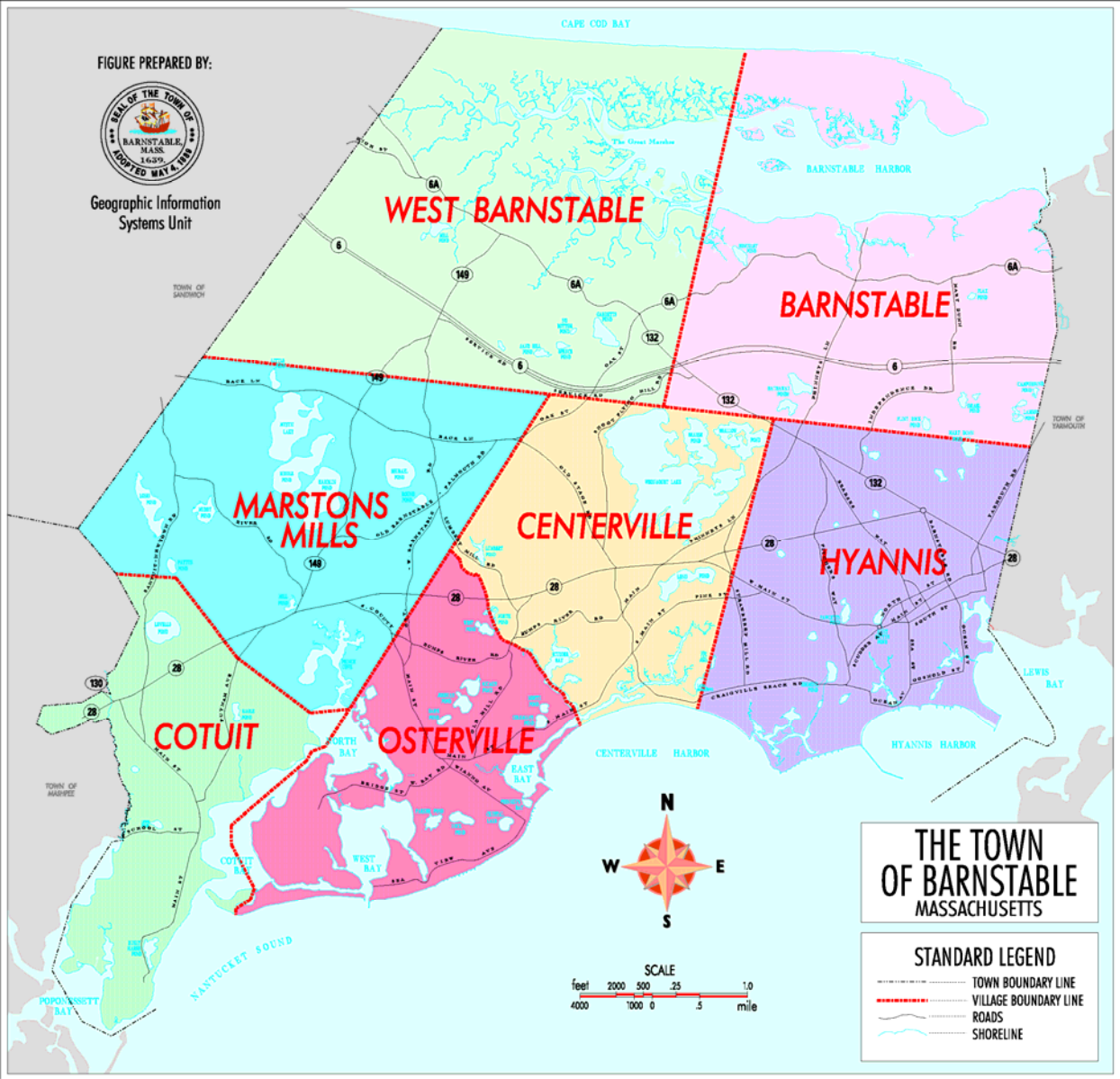
<b>C-OMM FIRE</b>		<b>QUICK ACCESS PRE-PLAN</b>		 <b>120</b>	
<b>FACILITY NAME:</b> ROSE LODGE & ROSE LODGE ROOMING HOUSE				<b>BOX ALARM</b>	
<b>ADDRESS:</b> 1555-1575 Iyannough Rd. (Rte. 132) Cent.				<b>DISTRICT</b> 1-3-2 HB	
<b>KNOX BOX LOCATION:</b> RIGHT OF THE MAIN OFFICE					
<b>NEAREST WATER SUPPLY:</b> HYDRANT AT 1513 Rte. 132 - Cape Cod Center - 600' lay					
<b>SPRINKLER SYSTEM:</b> NONE	<b>STANDPIPES:</b> NONE	<b>FIRE DEPT. CONN:</b> NONE	<b>BLDG. SIZE:</b> Main bldg. 157' X 22'		
			<b>GPM &amp; PERSONNEL DELIVERY NEEDS:</b>		
			% Involvement	25%	50%
			FIRE FLOW	575	1152
			ALARM ASSIGNMENT	1st	2nd
				75%	100%
				1727	2303
				2nd	2nd
			<b>BUILDING UTILITIES:</b>		
			Electric Meters - Side B of Lodge, Side A of Rooming House		
			Gas Meters - Side B of Lodge, Side C of Rooming House		
<b>FIRE ALARM SYSTEM:</b> PULL STATIONS LODGE					
<b>ANNUNCIATOR:</b> OFFICE FOR LODGE / FOYER @ HOUSE					
<b>FIRE ALARM PANEL:</b> OFFICE FOR LODGE / FOYER @ HOUSE					
<b>SPECIAL HAZARDS:</b>  <b>High life hazard. Short &amp; Long Term occupancy. Older wood frame building. 11/02 Pre-plan notes open crawl spaces around property. Many 20lbs. propane tanks around all buildings.</b>					
<b>TRUSS ROOF CONSTRUCTION:</b> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>					

Closest hydrant at 1513 Route 132 - Cape Cod Center

Appendix B

Map of the Town of Barnstable showing the C-O-MM Fire District



## Appendix C

Pre-Fire Plan Survey  
**Centerville-Osterville-Marstons Mills**  
**Dept. of Fire-Rescue & Emergency Services**  
**1875 Route 28**

Centerville, MA 02632

1. Does your department currently have pre-fire plans on your apparatus?
2. If so, is this a hard copy (printed) or on a computer?
3. Who is responsible in developing and maintain up-to-date pre-plans within your department?
4. If you do have preplans how do you prioritize which occupancies that these preplans are developed for?
5. If you do have preplans did you develop your own form/system or did you purchase a commercial program, and if so, which one?
6. If your department presently does not have pre-fire plans which is the main reason for why not?

## Appendix D

**C-O-MM Fire: Pre-Incident Planning Chart**  
**Centerville-Osterville-Marstons Mills**  
**Dept. of Fire-Rescue & Emergency Services**

**Pre-Incident Planning Chart**  
**Personnel per GPM on the Fireground**  
**Apparatus deployment**

This chart was developed for use in pre-incident planning to help define a consistency in assigning multiple alarms to a structure based upon fire flow and the National Fire Academy's standard of length x width divided by three. This chart is based upon the estimated gallons per minute flowing and the average personnel/apparatus available at the incident scene using the department's single/multiple alarm assignments.

Special considerations should always be given to the specific incident; these numbers are averages and do not take into account EMS, HAZ MAT, or other circumstances. These figures are based upon ordinary construction with no special hazards/considerations.

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AVERAGE NUMBER OF PERSONNEL PER ALARM ASSIGNMENT				
<b>1<sup>st</sup> ALARM</b>	<b>2<sup>nd</sup> ALARM</b>	<b>3<sup>rd</sup> ALARM</b>	<b>4<sup>th</sup> ALARM</b>	<b>5<sup>th</sup> ALARM</b>
<b>22</b>	<b>31</b>	<b>49</b>	<b>64</b>	<b>82</b>

All total represent an average total number of people operating at the incident scene after that alarm has been struck. It does not include station coverage and/or special call apparatus.

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APPARATUS TO THE SCENE PER ALARM				
<b>1<sup>st</sup> ALARM</b>	<b>2<sup>nd</sup> ALARM</b>	<b>3<sup>rd</sup> ALARM</b>	<b>4<sup>th</sup> ALARM</b>	<b>5<sup>th</sup> ALARM</b>
4 Engines	2 Engines	2 Engines	2 Engines	2 Engines
1 Ladder	1 Heavy Rescue	1 Ladder	1 Ladder	1 Ladder
1 Ambulance	1 Chief Officer	1 Ambulance	1 Ambulance	1 Ambulance
1 Shift Commander		1 Chief	1 Chief	1 Chief

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0 – 1100 GPM – First Alarm

Based upon 50 GPM per firefighter

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1101-2325 GPM – Second Alarm

Based upon 75 GPM per firefighter

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2326 – 4900 GPM – Third Alarm

Based upon 100 GPM per firefighter

---

4901 – 8000 GPM – Fourth Alarm

Based upon 125 GPM per firefighter

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8001-12,300 GPM – Fifth Alarm

Based upon 150 GPM per firefighter

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12,301 GPM or greater

Sixth Alarm / Special Call

Staffing estimates – mutual aid companies

Engine – 4 firefighters

Ladder – 4 firefighters

Heavy Rescue – 3 firefighters

Ambulance – 2 EMTs/Paramedics

## Appendix E

## NFPA 1620: Example of Preplan Form

<b>Anytown Fire Company Pre-Incident Plan</b>				<b>Pre-Plan #</b>		D-5-03	
<b>Address:</b>	1875 Robert Road		<b>Name:</b>	Manor Apartments		<b>District:</b>	1
<b>Emergency Contacts:</b>	Manager: Apt. C101 James Carr 885-4444						
<b>Occupancy and Hazards:</b>	Apartments on 1st and 2nd floors — 1 and 2 bedrooms Basement: Used for storage and utilities						
<b>Construction:</b>	Roof: Shingles on wood <u>trusses</u> Corridor doors are wood No interior fire barriers; common attic truss space						
<b>Protection:</b>	Fire alarm panels for each building Detectors in common areas and basement						
<b>Water Supplies:</b>	Hydrant on Wanamaker Road has a low volume: < 1300 L/min (< 500 gpm). Drafting supply is limited from creek. Nearest large volume supply: Robert Road and Highland Avenue — 760 m (2500 ft) west						
<b>Water Supply — Needed Fire Flow</b>		<b>Initial Dispatch</b>					
<b>Involvement</b>	<b>L/min (gpm)</b>	<b>Engines</b>	<b>Ladders</b>	<b>Chiefs</b>	<b>Special Units</b>	<b>EMS</b>	<b>Others</b>
50% Bldg. G:	6435 (1700)	2	1	1		1	
100% Bldg. G:	12,870 (3400)						
<b>Special Resources:</b>							
<b>Exposures:</b>	Building to building exposures Railroad — East of parking lot near Buildings E and F						
<b>Strategies:</b>	Rescue: Aerial access restricted to Buildings D and J, ground ladders needed.						
<b>Comments:</b>	Utilities: Individual shutoffs for all buildings, boilers in basements						

